

**Target Generation Facility  
(TGF)  
Simulation Pilot Operations Guide  
Fifteenth Edition**

Contract Number: DTFAWA-10A-00020

May 2015

Prepared for:  
CO: Kim Knight

COR: Mike Ross  
ACOR: Scott Doucett

ANG-E161

Federal Aviation Administration  
William J. Hughes Technical Center  
Atlantic City Int'l Airport, NJ 08405

Prepared by:



1027 Route 9 South  
Palermo, NJ 08223

# Table of Contents

1.0	Overview: Operating a Pilot Station.....	1
1.1	Referenced Documents .....	1
1.2	Acronym List .....	1
1.3	Functions of the Pilot Station.....	2
2.0	Pilot Station Terminal Panel .....	3
2.1	Menu Bar .....	4
2.1.1	File Menu .....	4
2.1.2	Prefs Menu .....	8
2.1.3	Datalink Menu .....	12
2.1.4	PVD Menu .....	15
2.1.5	Help Menu .....	15
2.2	The Instrument Panel .....	18
2.2.1	Aircraft Tabs .....	20
2.3	The Control and Info Panel.....	20
2.3.1	The Control Panel .....	21
2.3.2	Points of Reference Panel. ....	26
2.3.3	Tabular Control Panel.....	28
2.4	Commands Entered Panel .....	35
2.5	Pilot Messages Panel.....	36
2.6	Function Key (Macros) Panel .....	37
2.7	The Planned View Display Panel (PVD).....	38
3.0	Aircraft Equipment .....	40
4.0	Acknowledgements.....	41

# Table of Figures

Figure 1 Pilot Station .....	3
Figure 2 Menu Bar .....	4
Figure 3 Pilot Station File Menu.....	4
Figure 4 Pilot Station Macro Menu .....	4
Figure 5 Save SimPilot Macros .....	5
Figure 6 Choose SimPilot Macros .....	5
Figure 7 PVD Preferences Menu .....	6
Figure 8 Save Preferences.....	6
Figure 9 Load Preferences .....	7
Figure 10 Pref Menu .....	8
Figure 11 Font Dialog.....	8
Figure 12 Aircraft Following Menu.....	9
Figure 13 Frequency Display Menu .....	9
Figure 14 Sector Name First In Drop Down.....	10
Figure 15 Frequency First In Drop Down.....	10
Figure 16 Current Route Menu .....	10
Figure 17 Current Route .....	10
Figure 18 Current Route With Bracket Logic Command.....	11
Figure 19 NAS Route.....	11
Figure 20 Row Adjustment Menu.....	11
Figure 21 Row Spacing Set to 0 .....	11
Figure 22 Row Spacing Set to 25 .....	11
Figure 23 Datalink Menu .....	12
Figure 24 Datalink Dialog .....	12
Figure 25 Datalink Message Table .....	13
Figure 26 Datalink Filter Menu .....	13
Figure 27 Remove Finished Message Checkbox.....	14
Figure 28 Pilot Response Buttons.....	14
Figure 29 Help Menu .....	15
Figure 30 About Dialog .....	16
Figure 31 PVD Manual Window .....	17
Figure 32 Pilot Station Instrument Panel.....	18
Figure 33 An Aircraft Selected in the Table.....	20
Figure 34 Pilot Station Aircraft Control And Info Panel.....	20
Figure 35 Pilot Station Control Panel .....	21
Figure 36 Pilot Beacon Code Display.....	21
Figure 37 Pilot Beacon Code Text Entry Field.....	21
Figure 38 Pilot Altitude Rate Display.....	22
Figure 39 Pilot Altitude Rate Text Entry Field.....	22
Figure 40 Pilot Route Display Command Popup.....	23
Figure 41 Pilot Hold Command Popup.....	23
Figure 42 Pilot Cross Command Popup .....	24
Figure 43 Control Panel with an Invalid Aircraft Selection .....	24
Figure 44 Points Of Reference Panel.....	26

Figure 45	Points Of Reference Dialog.....	27
Figure 46	By Pvd Selection Panel .....	28
Figure 47	Tabular Control Panel.....	29
Figure 48	The Arrival Tab .....	29
Figure 49	RNAV Approach Dialog .....	30
Figure 50	Mid Field Landing Dialog .....	30
Figure 51	The Departure Tab.....	31
Figure 52	The Departure Tab.....	32
Figure 53	The Aircraft Data Tab .....	33
Figure 54	The Special Procedures Tab .....	34
Figure 55	Commands Entered Panel.....	35
Figure 56	Commands Entered .....	35
Figure 57	Pilot Messages Panel .....	36
Figure 58	Pilot Station Command Macros Panel.....	37
Figure 59	Pilot Station Planned View Display Panel .....	39

# 1.0 Overview: Operating a Pilot Station

This section provides a brief overview of the content of this manual, which is available at [www.faa.gov/go/tgf](http://www.faa.gov/go/tgf) under “TGF Simulation Pilot Operations (SPO)”.

## 1.1 Referenced Documents

This manual references the following documents:

- The “TGF Java Plan View Display” Manual at [www.faa.gov/go/tgf](http://www.faa.gov/go/tgf)
- The Aircraft Equipment Suffix Table 2-3-8 in “7110.65T Air Traffic Control” Manual at [http://www.faa.gov/airports\\_airtraffic/air\\_traffic/publications/atpubs/ATC/Chp2/atc0203.html#t1846atc](http://www.faa.gov/airports_airtraffic/air_traffic/publications/atpubs/ATC/Chp2/atc0203.html#t1846atc)

## 1.2 Acronym List

Below is a list of acronyms used in this document.

- **FL** – Flight Level
- **IAS** – Indicate Airspeed
- **ILS** – Instrument Landing System
- **MSL** – Mean Sea Level
- **PVD** – Planned View Display
- **RNAV** – Area Navigation
- **SP** – SimPilot
- **SPW** – SimPilot Workstation
- **TGF** – Target Generation Facility
- **VAIE** – Visual Airport Immersion Environment

## 1.3 Functions of the Pilot Station

The Simulation Pilot Work Station (SPW) provides the functions necessary for a Simulation Pilot (SP) to issue commands, and monitor the status of aircraft they control (fly/pilot) – often several aircraft during a simulation. Each SPW represents a particular sector and frequency; a geographical region of space, and contains several separate processes to assist a SP in piloting assigned aircraft.

The SPW can be broken into the following defining processes (see Figure 1 Pilot Station):

- **Menu Bar** - Allows for customization of SPW.
- **The Instrument Panel** - Presents aircraft data required to monitor the status and progress of all aircraft under SP control. It contains the aircraft call sign, the actual/commanded magnetic heading, the actual/commanded altitude, the actual/commanded airspeed, the actual Mach number, the status, and the runway information.
- **The Aircraft Info Panel** – Displays information on a selected flight and contains an area for the SP to input commands to control that aircraft.
- **The Commands Entered Panel** - Displays all commands that the SP has entered, or input by the data link, regardless of the validity.
- **The Pilot Message Panel** - Displays any error-messages/warnings from OS errors, or TGF errors when an invalid/improper command has been entered.
- **The Function Key (Macros) Panel** - Contains pre-made commands that can be entered into the Command Input Area with one key stroke.
- **The Planned View Display** - Gives the overall situational awareness of the airspace the SPW has been allocated- it is a birds-eye view of the local airspace. The position of aircraft allocated to the SPW will be found here, as will geographical symbols similar to an Air Traffic Controller's radar panel

The next section describes a more in depth look at the processes of the SPW.

## 2.0 Pilot Station Terminal Panel

This section provides a detailed explanation of the various parts of the SimPilot Workstation.

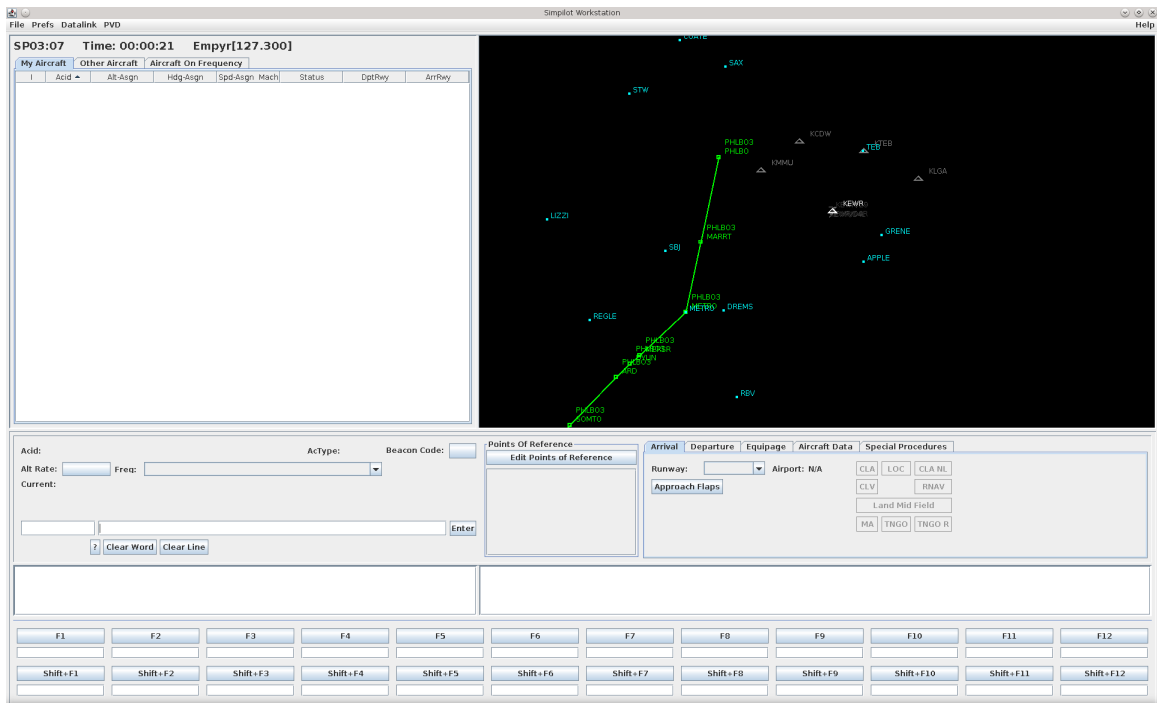


Figure 1 Pilot Station

## 2.1 Menu Bar

This section covers the menu bar.



Figure 2 Menu Bar

### 2.1.1 File Menu

This menu allows the user to load and save PVD and Macro settings. When the station first loads the last Macro and PVD settings associated with the station's assigned sector will be loaded. This association is computer dependent, that is, two computers which launch a station for the same sector may have different PVD and Macro files associated with the sector. Macro and PVD settings are associated with a sector when they are either saved or loaded on the station. If no Macro or PVD file is associated with the sector then nothing will be pre-loaded and defaults will be used.

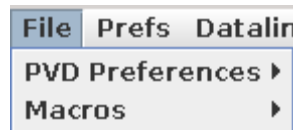


Figure 3 Pilot Station File Menu

#### 2.1.1.1 Macro Menu

The Macro Menu allows the user to load and save Macro Settings.

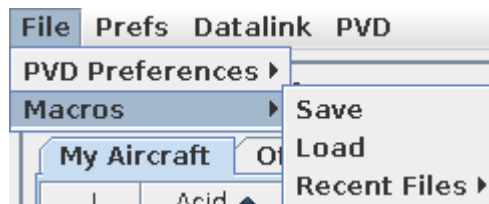


Figure 4 Pilot Station Macro Menu

To save changes to macros click on "Save" from the "Macros" menu on SimPilot Workstation Menu bar. **Note: Any modifications made to the function key macros must be saved if the user wishes to load them later.** All files are stored as ".macros" files typically in the /spData/macros/<projectName> folder.

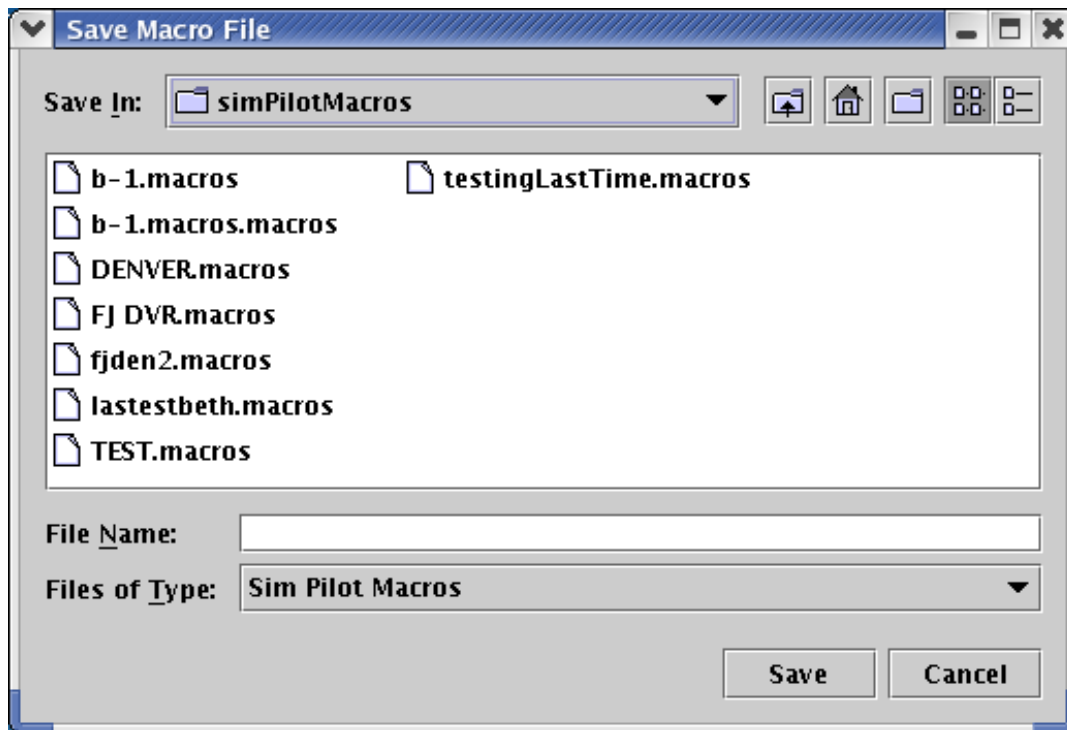


Figure 5 Save SimPilot Macros

To load saved macros, choose “Load” from the “Macros” menu on SimPilot Workstation Menu bar.

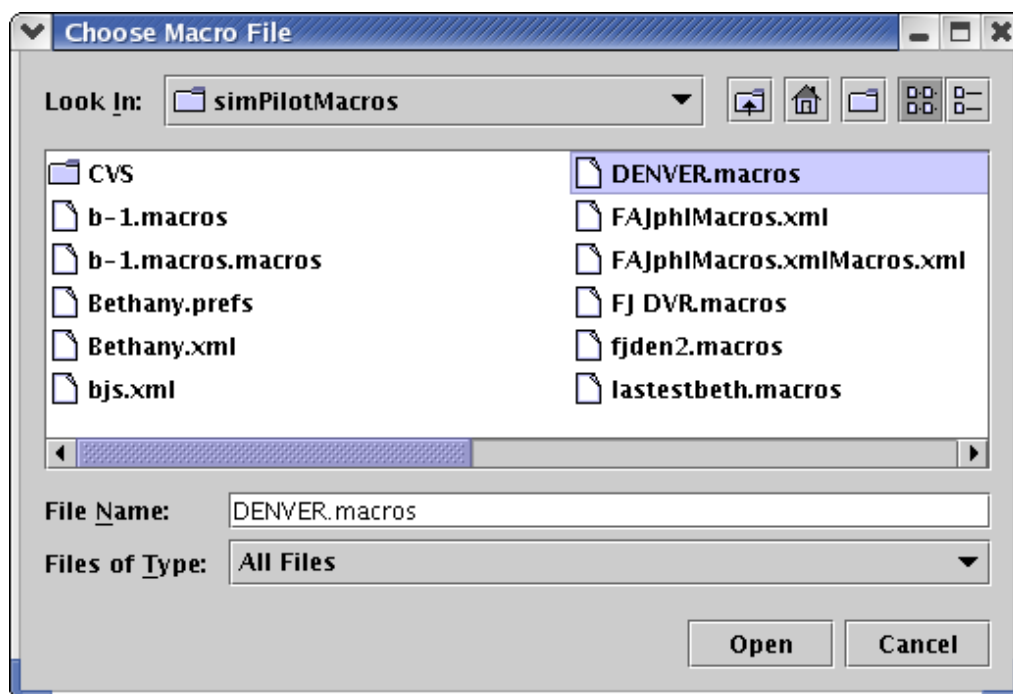


Figure 6 Choose SimPilot Macros

To load a recently loaded Macros file, if any are available, select it from the Recent Files list in the menu.

### 2.1.1.2 PVD Preferences Menu

The PVD Preferences Menu allows the user to save and load PVD preferences as well as station preferences such as aircraft following and Font. A full description of possible configuration to the station will follow shortly.

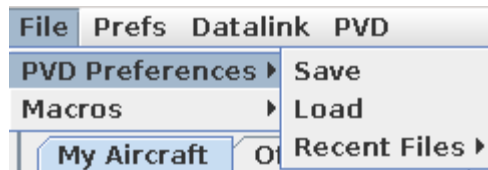


Figure 7 PVD Preferences Menu

The user can save any changes made to the configuration of a map by selecting the “Save Settings” option on the PVD Menu. Note: Any modifications made to the function key macros must be saved if the user wishes to load them later.

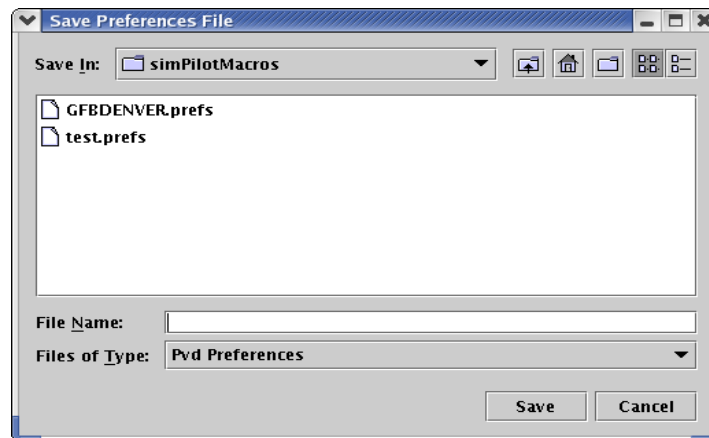
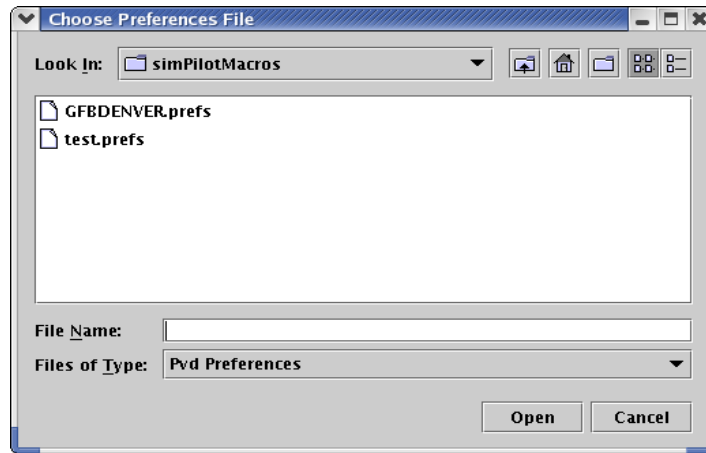


Figure 8 Save Preferences

The user can load saved map configurations by selecting the “Load Settings” option on the PVD Menu.



**Figure 9 Load Preferences**

These settings may be saved or loaded from previously saved as “.prefs” files – also typically in the /spData/macros/<projectName> folder.

To load a recently loaded PVD Preferences file, if any are available, select it from the Recent Files list in the menu.

More information on using the PVD is available at [www.faa.gov/go/tgf](http://www.faa.gov/go/tgf) under “TGF Java Plan View Display” Manual or under the SPW’s

Help Menu (Section 0).

## 2.1.2 Prefs Menu

The Prefs Menu allows the user to change various display option within the station itself. This does not include, NAVAIDs or other airspace data, for information on how to configure the PVD please refer to the PVD menu in section 2.1.4:PVD Menu. All of the following settings will be saved or loaded when the user saves or loads PVD Preference files.

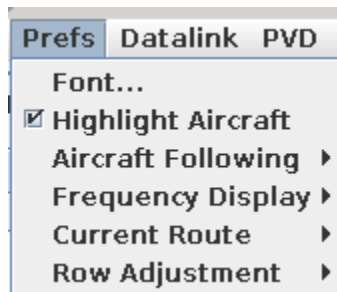


Figure 10 Pref Menu

### 2.1.2.1 Font Menu

The Font Menu option allows the user to select a font to use to display the text. A font dialog will be displayed.

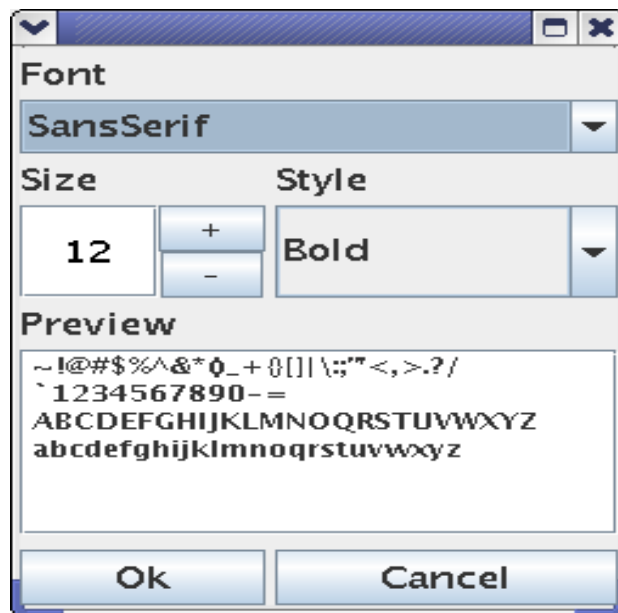


Figure 11 Font Dialog

### 2.1.2.2 Highlight Aircraft Option

The “Highlight Aircraft” option allows the user to choose whether the selected aircraft should be highlighted in the PVD or not.

### 2.1.2.3 Aircraft Following Menu

The Aircraft Following Menu allows the user to determine how to reposition the PVD when an aircraft is selected.

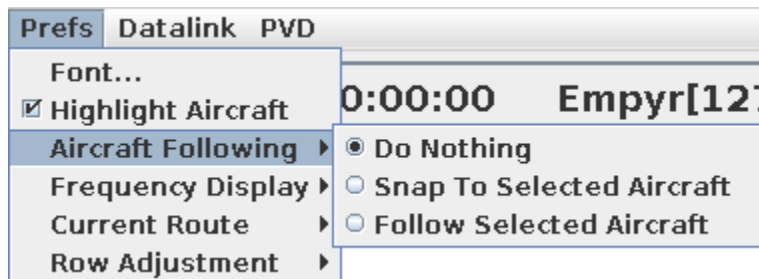


Figure 12 Aircraft Following Menu

- **Do Nothing:** Don't adjust the PVD's center on aircraft selection
- **Snap To Selected Aircraft:** When an aircraft is first selected, adjust the PVD so that the selected aircraft is at its center.
- **Follow Selected Aircraft:** While an aircraft is selected, adjust the PVD so that the selected aircraft is always in the center.

The default is to do nothing.

### 2.1.2.4 Frequency Display Menu

The Frequency Display Menu allows the user to configure how they want the Control Panels frequency drop down to display frequencies. For more information on the Control Panel see section 2.3.1: The Control Panel.

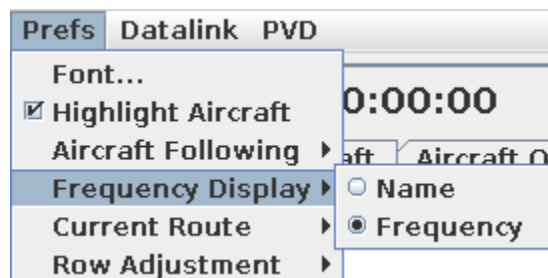


Figure 13 Frequency Display Menu

- **Name:** Display the sector name first and then the frequency.

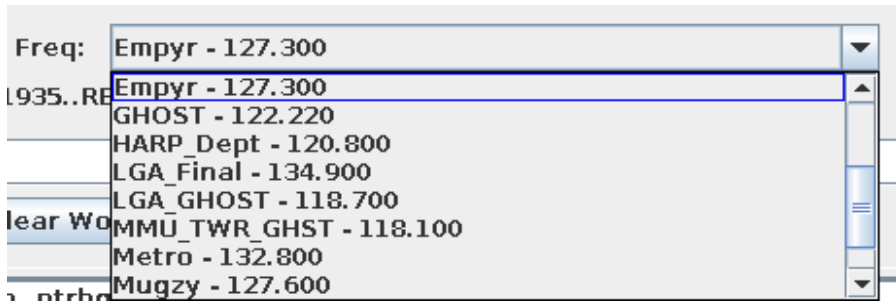


Figure 14 Sector Name First In Drop Down

- **Frequency:** Display the frequency first and then the Sector name

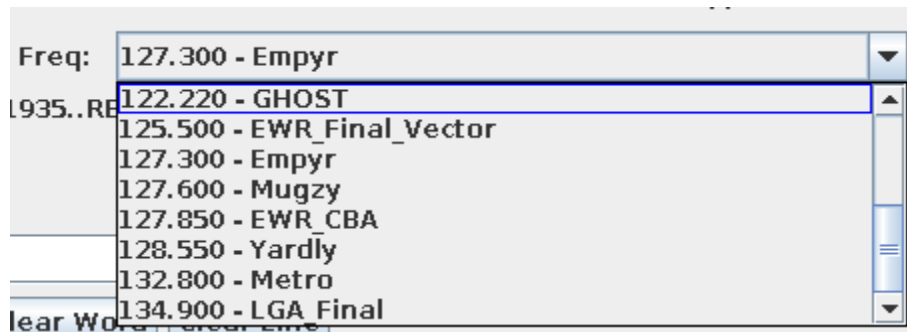


Figure 15 Frequency First In Drop Down

### 2.1.2.5 Current Route Menu

The Current Route Menu allows the user to choose how the route is displayed in the Control Panel. For more information on the Control Panel as well as special features associated with the different types of route displays see section 2.3.1.3:Control Panel Row 3.

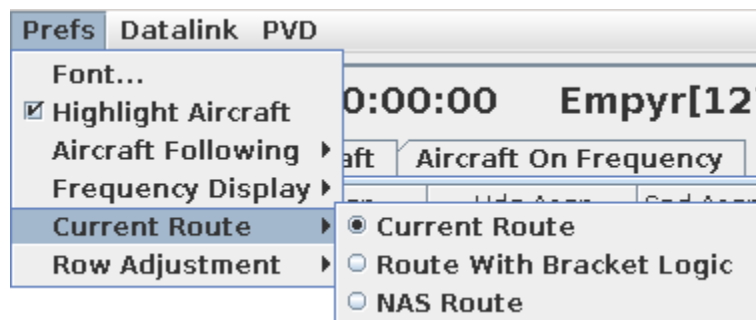


Figure 16 Current Route Menu

- **Current Route:** Displays the selected aircraft's current route

Current: 401948/-0741935..RENU..APPLE..GRENE..DIALS..KLGA

Figure 17 Current Route

- **Route With Bracket Logic:** Displays the selected aircraft's current route with any crossing or command actions associated with the route's fixes.

Current[]:401948/-0741935[CMD=TD ON]..RENU..APPLE..GRENE..DIALS..KLGA

Figure 18 Current Route With Bracket Logic Command

- **NAS Route:** Displays the selected aircraft's NAS filed route.

NAS Route:KCMH..HLG..ETG.MIP4.KLGA

Figure 19 NAS Route

### 2.1.2.6 Row Adjustment Menu

The Row Adjustment Menu allows the user to add spacing between the rows in the Aircraft Tables for easier readability. For more information on the aircraft tables see section 2.2.1:Aircraft Tabs.

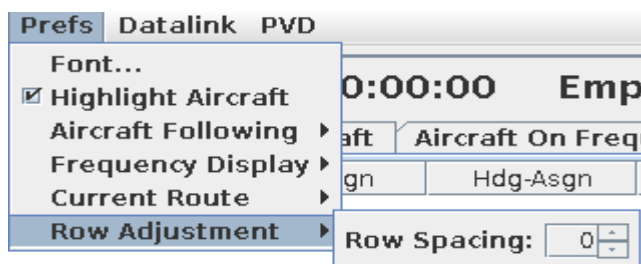


Figure 20 Row Adjustment Menu

My Aircraft   Other Aircraft   Aircraft On Frequency								
I	Acid ▲	Alt-Asgn	Hdg-Asgn	Spd-Asgn	Mach	Status	DptRwy	ArrRwy
1	AAL1112	100-100	122-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31
2	AAL304	100-100	114-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31
3	AWI3800	070-070	051-000	250-250	0.43	ON_ROUTE	N/A	KLGA/31
4	DAL649	100-100	055-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31

Figure 21 Row Spacing Set to 0

My Aircraft   Other Aircraft   Aircraft On Frequency								
I	Acid ▲	Alt-Asgn	Hdg-Asgn	Spd-Asgn	Mach	Status	DptRwy	ArrRwy
1	AAL1112	100-100	122-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31
2	AAL304	100-100	114-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31
3	AWI3800	070-070	051-000	250-250	0.43	ON_ROUTE	N/A	KLGA/31
4	DAL649	100-100	055-000	250-250	0.45	ON_ROUTE	N/A	KLGA/31

Figure 22 Row Spacing Set to 25

### 2.1.3 Datalink Menu

The Datalink Menu allows the user to display the Datalink Dialog.

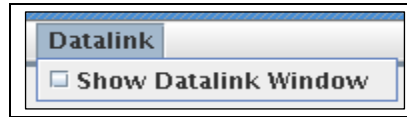


Figure 23 Datalink Menu

#### 2.1.3.1 Datalink Dialog

The Datalink Dialog allows a user to interact with Datalink messages sent by the controller. It lists the SimPilot commands sent by a Controller this allows users to view all the Datalink messages sent to the SPW's currently assigned frequency. The Datalink Dialog can be broken into three separate parts the Datalink Message Table, the Remove Finished Messages Checkbox, and the Pilot Response Buttons.

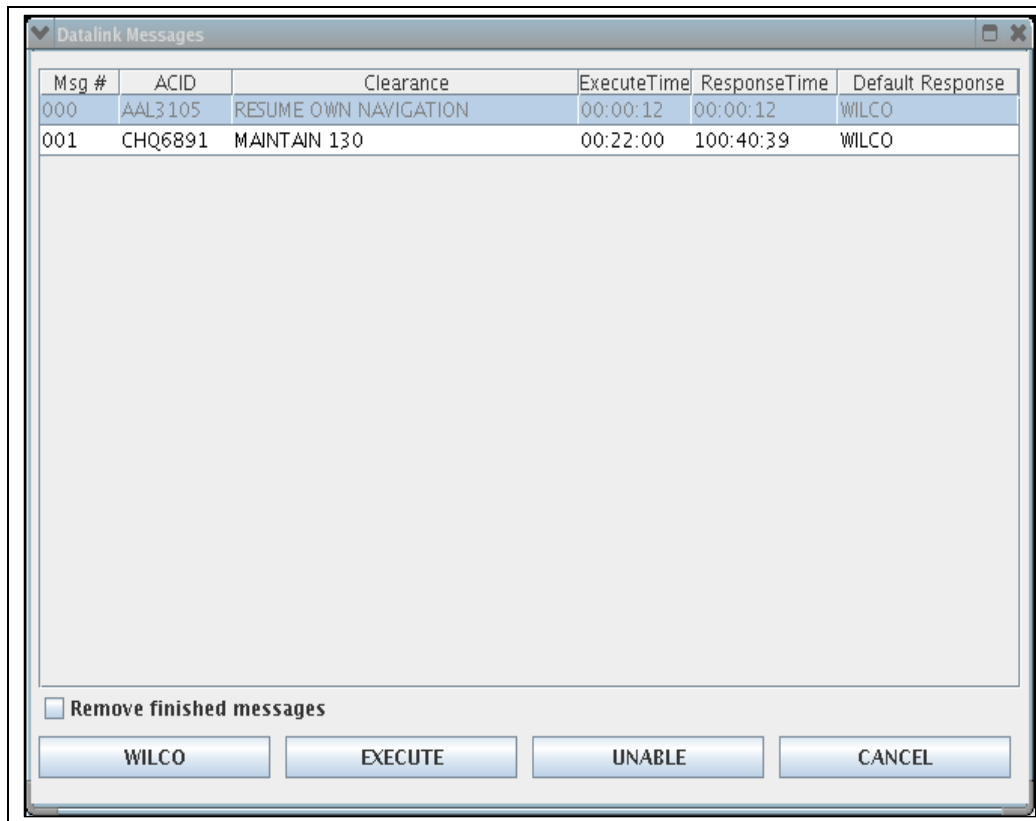


Figure 24 Datalink Dialog

The Datalink Message Table displays the Datalink Messages received. The table lists the following:

- **Msg #** – A number assigned to the message used to uniquely identify the message.
- **ACID** – The ID of the Aircraft the message is for.
- **Clearance** – The Air Traffic Control (ATC) Clearance the Controller issued.
- **Execution Time** – The simulation time at which the aircraft will execute the clearance.
- **Response Time** – The simulation time at which the message will be responded to, if no action is taken.
- **Default Response** – What Response for the command will be sent, if no action is taken.

Msg #	ACID	Clearance	ExecuteTime	ResponseTime	Default Response
000	AAL3105	RESUME OWN NAVIGATION	00:00:12	00:00:12	WILCO
001	CHQ6891	MAINTAIN 130	00:22:00	100:40:39	WILCO

**Figure 25 Datalink Message Table**

Messages that have been replied to and the clearance executed will appear with grayed out text (if not removed); otherwise, the text will be displayed in black. The currently selected row in the table appears with a light blue background.

If the user right clicks on a row in the Datalink message table a menu appears which will allow them to filter the messages displayed.

Msg #
ACID
Clearance
ExecuteTime
ResponseTime
Default Response
SPW ID
Show all

**Figure 26 Datalink Filter Menu**

The Remove Finished Message Checkbox allows the user to remove Datalink messages that have been responded to and executed. If the box is checked then finished messages are permanently removed from the Datalink Message Table, otherwise finished messages remain listed in the table.



**Figure 27 Remove Finished Message Checkbox**

The Pilot Response Buttons allow the user to respond to a Datalink message. A response message is sent via Datalink unless otherwise listed. The user may choose from the following options:

- **Wilco** – Commands sent with message will be executed.
- **Execute** – Commands sent with message will be executed but no response is sent via Datalink.
- **Unable** – SimPilot is unable to comply with commands sent with this message at this time.
- **Cancel** – Commands sent with message were canceled.



**Figure 28 Pilot Response Buttons**

One scenario where the Datalink Dialog may be used is when a Controller contacts a Pilot via Voice Communications to cancel a message. A Controller may say “(Aircraft identification), *DISREGARD AND UNABLE DATA LINK (message content or type) MESSAGE(S).*” For example, A Controller may say “**American five twenty-three, DISREGARD AND UNABLE DATA LINK Climb to flight level 230 Message.**” The user would find the message in the Datalink Message in the Datalink Message Table and click on it and then click on the “Cancel” button.

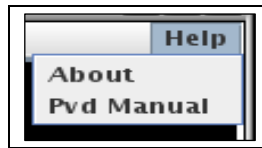
### 2.1.4 PVD Menu

This menu allows the user to customize what information is displayed on the SPW's map. In addition, it allows the user to customize how the information is displayed. See Section 0

Help Menu for more information on the various options in this menu.

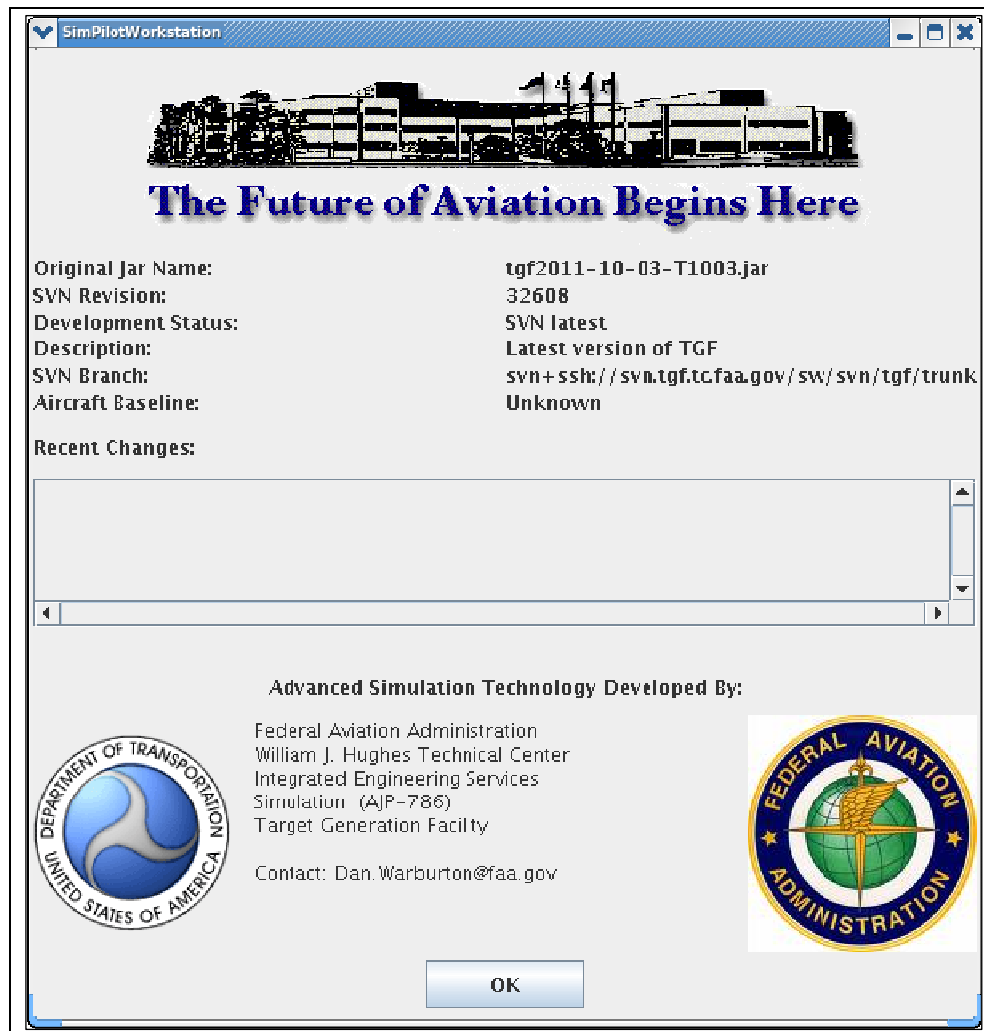
### 2.1.5 Help Menu

The Help Menu contains options that display useful information to the user.



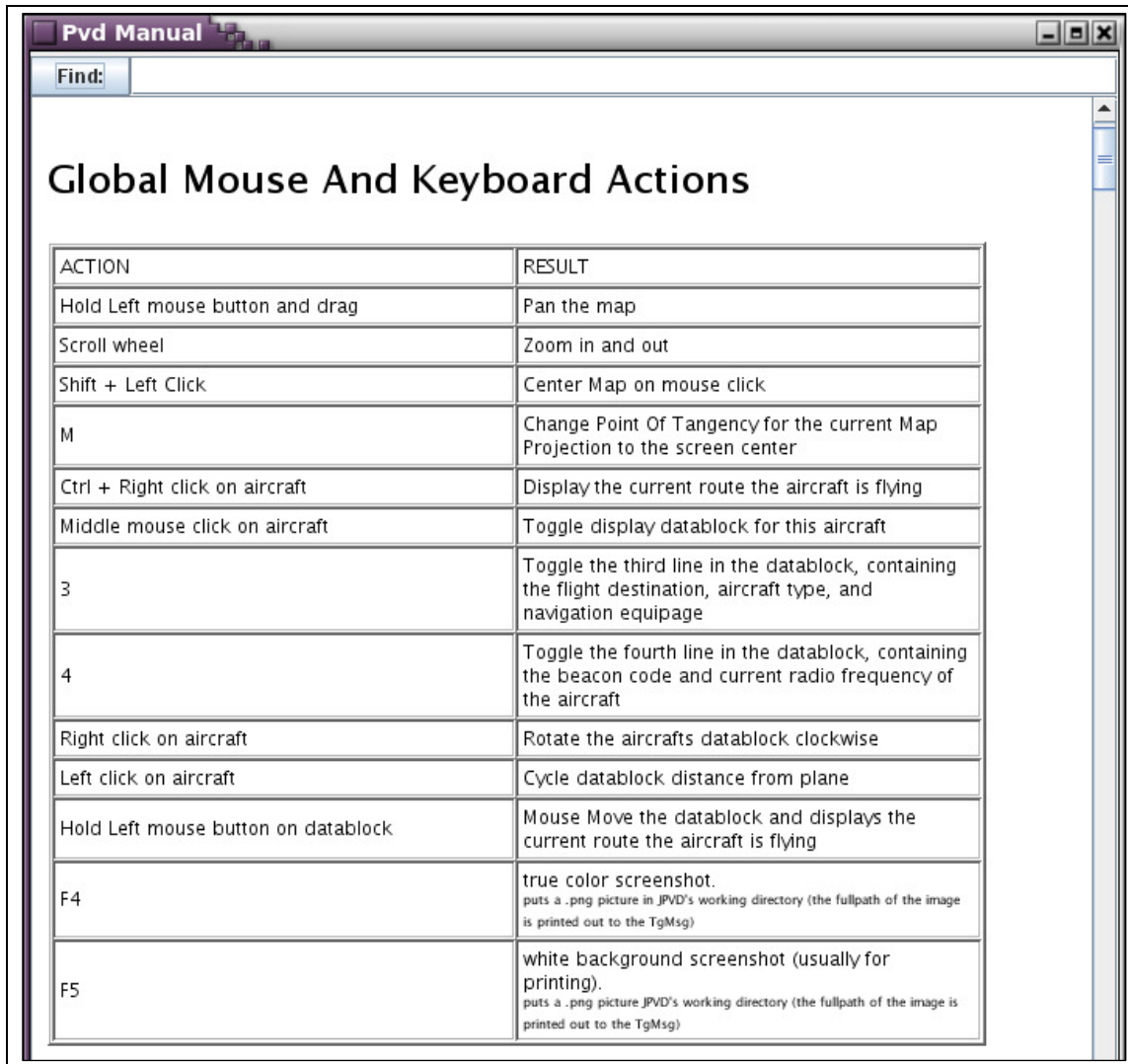
**Figure 29 Help Menu**

The “About” option displays a dialog that displays information on the TGF version used to run the SPW.



**Figure 30 About Dialog**

The “Pvd Manual” option displays a window containing information on how to use the Planned View Display (PVD). This Manual is also available at [www.faa.gov/go/tgf](http://www.faa.gov/go/tgf) under “TGF Java Plan View Display”.



**Figure 31 PVD Manual Window**

## 2.2 The Instrument Panel

This panel presents aircraft data required to monitor the status and progress of all aircraft under the SP control.

SP03:07    Time: 00:00:21    Empyr[127.300]							
My Aircraft		Other Aircraft		Aircraft On Frequency			
I	Acid ▲	Alt-Asgn	Hdg-Asgn	Spd-Asgn	Mach	Status	DptRwy    ArrRwy

Figure 32 Pilot Station Instrument Panel

The area directly below the menu bar displays data unique to the SPW. In order from left to right:

- The Simpilot Name and the offset the station is listening for information on
- The elapsed simulation time.
- The sector name.
- The frequency the SPW is simulating.

Below this area lies the list of aircraft. The data displayed in order from left to right:

- Aircraft Index number.
- Aircraft identification. (ACID - Call Sign)
- Actual altitude (hundreds of feet) – Assigned actual altitude (hundreds of feet).
- Actual magnetic heading – Assigned magnetic heading.
- Actual indicated airspeed (knots) – Assigned indicated airspeed (knots) - Actual Mach speed.
- Status – Displays the status of an aircraft. It will indicate the following:
  1. **AT\_GATE** – An aircraft has just reached its arrival gate.
  2. **CLRD\_TAKEOFF** – An aircraft is cleared for take off, and it is starting to take off from its departure runway.
  3. **COLLISION\_AVOIDANCE\_HOLD** – An aircraft on the ground is holding in order to avoid colliding with another aircraft
  4. **CRASHED** - An aircraft has crashed into either the ground or another object and is unresponsive.
  5. **DEPARTING** – An aircraft is departing, after a FlightActivatedEvent and before an AtManeuverAltitudeEvent.
  6. **EXITING\_RWY** – An aircraft has just touched down and is braking before exiting the runway.
  7. **FOLLOW** – The aircraft is following another aircraft.

8. **GATE\_HOLD** – An aircraft is being held at gate; FlightActivatedEvent not granted immediately.
9. **GROUND\_HOLD** – An aircraft on the ground is holding awaiting taxi instructions.
10. **GROUND\_TAXI** – An aircraft is moving around on the ground on its way to either the aircraft's departure runway or arrival gate.
11. **GROUP\_<groupID>** – The aircraft has joined a group of aircraft. The name of the group an aircraft is in appears after the group flying status. For example, GROUP\_GRP1 indicates that an aircraft is in a group called GRP1. (Note: Currently grouping has been disabled.)
12. **HOLD** – An aircraft is in a hold, after HoldStartEvent from starting hold pattern.
13. **HOVER** - A helicopter is hovering.
14. **ILS\_BEF\_FINL** – An aircraft is on ILS and on the localizer (received OnLocalizerEvent).
15. **ILS\_FINAL** – An aircraft is on ILS final approach (received PassedOuterMarkerEvent).
16. **JOIN\_ROUTE** – An aircraft is assigned to a route but has not yet reached it.
17. **LANDED** – An aircraft has touched down, just received a TouchdownEvent.
18. **MISSED\_APPR** – An aircraft is aborting approach (received MissedApproachEvent).
19. **NONILS\_BEF\_F** – An aircraft is not on ILS and on the localizer (received OnLocalizerEvent).
20. **NONILS\_FINAL** – An aircraft not on ILS, on final approach (got PassedOuterMarkerEvent).
21. **ON\_ROUTE** – An aircraft is EnRoute. In addition, it indicates that an aircraft is following its flight plan or returning to its flight plan holding aircraft after HoldEndEvent. This is typically an aircraft's initial state.
22. **ON\_VECTORS** – An aircraft is not on route, and not meeting another state.
23. **PAST\_THRESH** – An aircraft has crossed runway threshold (got CrossedRwyThresholdEvent). Note: Currently not used.
24. **PREP\_APPRCH** – An aircraft is preparing for an approach.
25. **TAKEOFF\_HOLD** – An aircraft is in take off position on its departure runway. The aircraft is awaiting take off clearance.
26. **TAXEOFF\_TAXI** – An aircraft is taxiing in order to take off.
27. **TERMINATED** – An aircraft has terminated, received FlightTerminatedEvent
  - *Note:* A "\*" before a status indicates a group of aircraft's status. For example \*\_JOIN\_ROUTE, indicates a group of aircraft that is currently trying to join a route.

- DptRwy - The aircraft's departure runway (if any)
- ArrRwy - The aircraft's arrival runway (if any)

## 2.2.1 Aircraft Tabs

There are three different tabs, each of which display aircraft information in a table. Clicking on any of these aircraft will highlight that aircraft's row in the table and set it as the selected aircraft which can then be sent simpilot commands.

My Aircraft   Other Aircraft   Aircraft On Frequency								
I	Acid ▲	Alt-Asgn	Hdg-Asgn	Spd-Asgn	Mach	Status	DptRwy	ArrRwy
1	AAL1112	100-100	122-000	250-250	0.45	ON ROUTE	N/A	KLGA/31
2	AAL304	100-100	114-000	250-250	0.45	ON ROUTE	N/A	KLGA/31
3	AWI3800	070-070	051-000	250-250	0.43	ON ROUTE	N/A	KLGA/31
4	DAL649	100-100	055-000	250-250	0.45	ON ROUTE	N/A	KLGA/31

Figure 33 An Aircraft Selected in the Table

Each Tab displays different aircraft information:

- **My Aircraft:** Displays the aircraft that are assigned to this simpilot station. Adjusting the column width or column positioning in this table also adjusts the columns in the tables on the other two tabs. This table has a white background.
- **Other Aircraft:** Displays all aircraft on this station's frequency but are not assigned to this station. This table has a green background.
- **Aircraft On Frequency:** Displays all the aircraft assigned to this station as well as all other aircraft that are assigned to this station's frequency. This table has a yellow background.

Pressing the “Page Up” and “Page Down” keys on the keyboard will cycle through each of the tabs.

## 2.3 The Control and Info Panel

Acid: AAL304   AMERICAN   AcType: MD88A   Beacon Code: 5133  
Alt Rate: 0   Freq: 127.300 - Empyr  
Current: FJC..LIZZI..BEUTY..HARLM..DREMS..APPLE..GRENE..DIALS..KLGA  
AAL304   Enter  
?   Clear Word   Clear Line

Points Of Reference  
Edit Points Of Reference  
058nm W ( 272deg) of KEWR:K6  
052nm N ( 350deg) of KPHL:K6

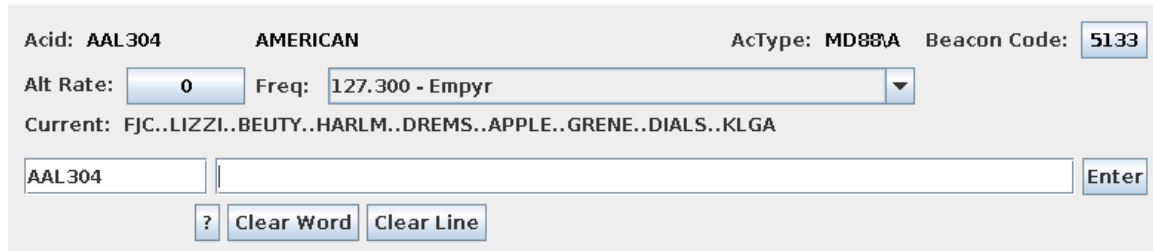
Arrival   Departure   Equipage   Aircraft Data   Special Procedures  
Runway: 31   Airport: KLGA   CLA   LOC   CLA NL  
Approach Flaps   CLV   RNAV  
Land Mid Field  
MA   TNGO   TNGO R

Figure 34 Pilot Station Aircraft Control And Info Panel

The Control and Info Panel consists of 3 main elements, the Control Panel, the Points Of Reference Panel and the Tabular Control Panel. Each panel works together in order to provide the user with as much functionality and information as possible.

## 2.3.1 The Control Panel

The Control Panel provides the user with the most important control capabilities and information for a selected aircraft.



The screenshot shows the Pilot Station Control Panel. At the top, it displays 'Acid: AAL304', 'AMERICAN', 'AcType: MD88A', and 'Beacon Code: 5133'. Below this, there are input fields for 'Alt Rate: 0' and 'Freq: 127.300 - Empyr'. A 'Current:' label is followed by a long text field containing 'FJC..LIZZI..BEUTY..HARLM..DREMS..APPLE..GRENE..DIALS..KLGA'. At the bottom, there is a text input field with 'AAL304', a 'Clear Word' button, a 'Clear Line' button, and an 'Enter' button.

Figure 35 Pilot Station Control Panel

### 2.3.1.1 Control Panel Row 1

The fields from left to right in row 1 are:

- 1) The Selected Aircraft's Callsign
- 2) The Aircraft's Carrier
- 3) The Aircraft type and the equipage code of the flight (see section 3.0:Aircraft Equipment for more information on equipage codes)
- 4) The Aircraft's Beacon Code

The Beacon Code display can be used to change the aircraft's current beacon code.



The screenshot shows a 'Beacon Code:' label followed by a text box containing the number '5063'.

Figure 36 Pilot Beacon Code Display

By clicking on the current beacon code, the user changes the display to a text entry field. The user can then enter a new beacon code and hit the enter key on their key board. Once enter is pressed, a command is sent to the ECO and the text entry field changes back to the beacon code display. The sent command is for the Aircraft displayed in Row 1 of the Command Panel. The sent command will be displayed in the Sent Command panel and a result will be shown the **Command Result** panel discussed in section 2.4:Commands Entered Panel



The screenshot shows a 'Beacon Code:' label followed by a text box containing the number '5063'. The text box has a blue border, indicating it is active for text entry.

Figure 37 Pilot Beacon Code Text Entry Field

### 2.3.1.2 Control Panel Row 2

The Fields from left to right are:

- 1) The Aircraft's Altitude Rate in Feet Per Minute

This display works similarly to the Beacon Code Display discussed in section 2.3.1.1:Control Panel Row 1. The Text Entry Field accepts both relative altitude rate changes, specified by + or – symbols or specific rates.

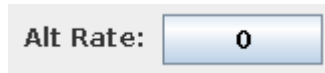


Figure 38 Pilot Altitude Rate Display



Figure 39 Pilot Altitude Rate Text Entry Field

- 2) The Aircraft's assigned frequency.

Adjusting the in frequency display from the Prefs menu in section 2.1.2.4:Frequency Display Menu will change this display. Similarly the user can also cycle through frequency displays by clicking on the “Freq:” label next to the frequency drop down.

When a user wishes to select change the selected aircraft's frequency, they need only click on the drop down and choose the appropriate frequency. This will automatically send a command to the ECO.

Some frequencies within a simulation are designed to terminate any aircraft assigned to them. These frequencies are displayed in red in the drop down to make the user more aware of this fact.

### 2.3.1.3 Control Panel Row 3

The Aircraft's Route:

Adjusting the aircraft's route display from the Prefs menu as discussed in section 2.1.2.5:Current Route Menu will change this display. Similarly the user can also cycle through the displayed route options by clicking on the label next to the displayed route.

When displaying the Aircraft's Current Route or its Current Route with Bracket Logic, the user can use this display to instruct the selected aircraft to fly direct to a fix, hold at a fix, or cross at a fix on the aircraft's route.

This is done by clicking on any of the waypoints in the display. Note: this is disabled for the NAS Route display as well for aircraft that are on the ground. When the user clicks on a waypoint in the display, a popup menu is displayed offering three command options.

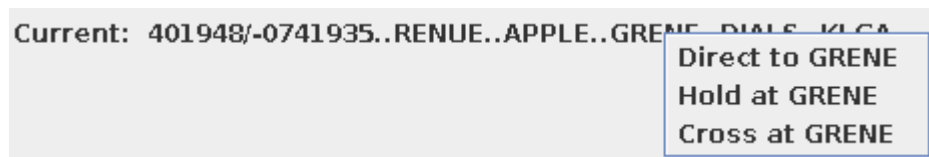


Figure 40 Pilot Route Display Command Popup

### 1) Direct to <Waypoint>

This automatically sends a direct command to the ECO for the selected waypoint.

### 2) Hold at <Waypoint>

This displays a popup to the user in order to define how to hold at the waypoint. Selecting the “Default Hold” and clicking the “OK” will perform a standard hold at the given fix. Choosing the “Defined Hold” option allows the user to define the turn direction at the hold fix, the outbound radial as well as the leg length for the hold.

If the user wishes to cancel creating a hold they need only click the “Cancel” button.

When the user clicks the “OK” button, the hold information is sent to the ECO.

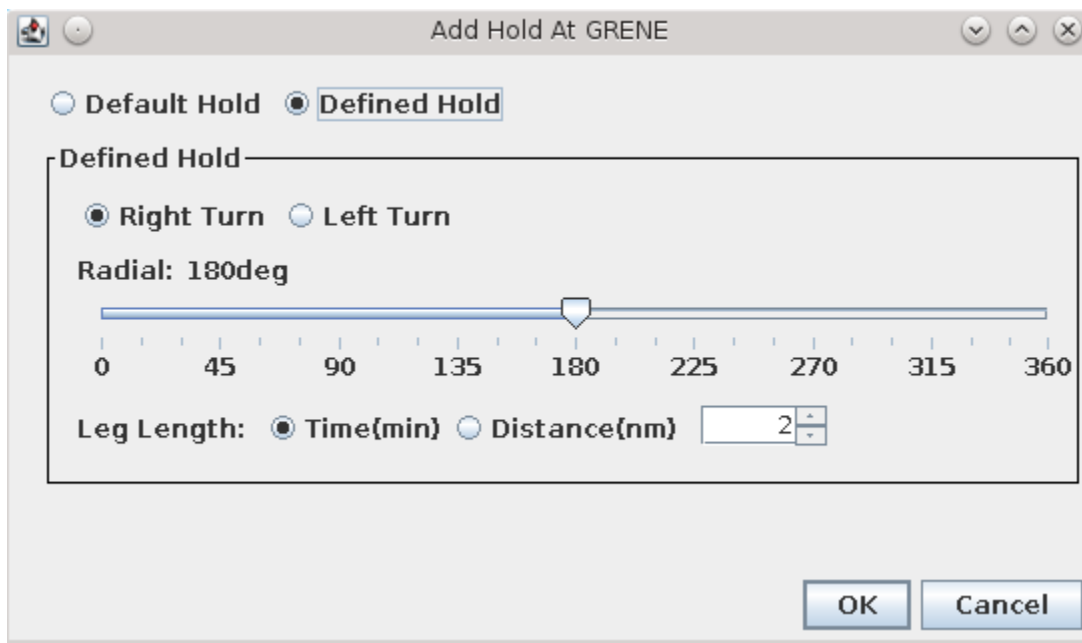


Figure 41 Pilot Hold Command Popup

### 3) Cross at <Waypoint>

This displays a popup to the user so that they can define how the aircraft should cross the selected waypoint. Parameters include:

- a. Altitude Crossings: At, At or Below (AOB), At or Above (AOA), or Block(BLOCK) altitudes. Altitudes are specified in hundreds of feet.

- b. Speed Crossings: Speed specified in knots.
- c. Time Dependent: The aircraft will do its best to cross the waypoint at the specified time.

The user can cancel crossing definition by clicking on the “Cancel” button. When the user clicks the “OK” button, the hold information is sent to the ECO.

Figure 42 Pilot Cross Command Popup

#### 2.3.1.4 Control Panel Row 4

The fields from left to right:

- 1) The Acid Text Field:

The Acid Text Field allows the user to enter aircraft call signs in order to set the selected aircraft. Similarly, the user can enter the index of one of the rows in the currently displayed Aircraft table in order to select that row’s aircraft.

When a valid aircraft is selected the Control Panel will populate its information displays as in **Figure 35**.

When an invalid selection is entered the Control Panel will populate its information displays with clear indications of an invalid selection as in **Figure 43**.

Figure 43 Control Panel with an Invalid Aircraft Selection

A selection is only invalid when the row index of the table is invalid or no aircraft can be found with that call sign.

To finalize a selection, the user can do one of the following:

- 1) Press the “Enter” Key on the keyboard
- 2) Press the “Space” Key on the keyboard
- 3) Pressing the “End” Key on the keyboard twice
- 4) Repeatedly Press or Hold the Right Arrow Key on the keyboard until the cursor enters the Command Text Field
- 5) Performing any other action which makes the Acid Text Field lose focus

When performing 1-4, the Command Text Field will gain focus allowing the user to start entering simipilot commands.

## 2) The Command Text Field:

This entry field allows the user to type in simipilot commands for the selected aircraft. The user can also use the Function keys for entering macro commands. For more information on using Function keys and the macro panel please see section 2.6:Function Key (Macros) Panel.

To send a command the user can press either the “Enter” button on the Control Panel or the “Enter” key on the keyboard. The command information is then sent to the ECO and is shown in the Command History Panel and a command result is displayed in the Command Result Panel discussed in section 2.4:Commands Entered Panel.

To quickly return focus to the Acid Text Field, the user can do one of the following:

- 1) Repeatedly Press or Hold the Left Arrow Key on the keyboard until the cursor enters the Acid Text Field
- 2) Repeatedly Press or hold the “Backspace” key on the keyboard until the cursor enters the Acid Text Field.

When the Curser reenters the Acid Text Field, the current acid text will be highlighted, this allows the user to immediately start typing the new call sign or index number for the next aircraft.

## 3) The Enter button

Pressing this button sends command information from the Command Text Field to the ECO and is shown in the Command History Panel and a command result is displayed in the Command Result Panel discussed in section 2.4:Commands Entered Panel.

### 2.3.1.5 Control Panel Row 5

The Fields from left to right are as follows:

- 1) The Help Button
  - a. Displays a description and usage for each simipilot command a user can enter. Th
- 2) The “Clear Word” Button

- a. Clears the last word entered in the Command Text Field
- 3) The “Clear Line” Button
- a. Removes all text from the Command Text Field.

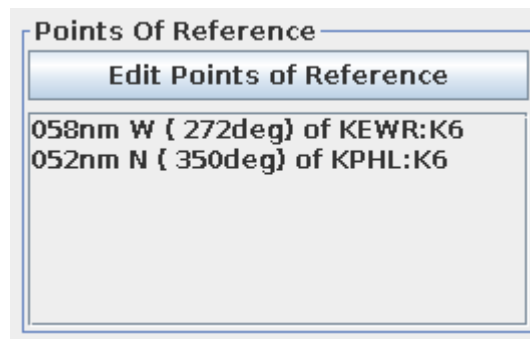
### 2.3.1.6 Other Aircraft Selection Techniques

In Addition to entering callsigns or table indexes in the Acid Text Field, the user can use the Arrow Up or Arrow Down keys on the keyboard in either the Acid Text Field or the Command Text Field to cycle through the aircraft in the currently displayed Aircraft Tab.

### 2.3.2 Points of Reference Panel.

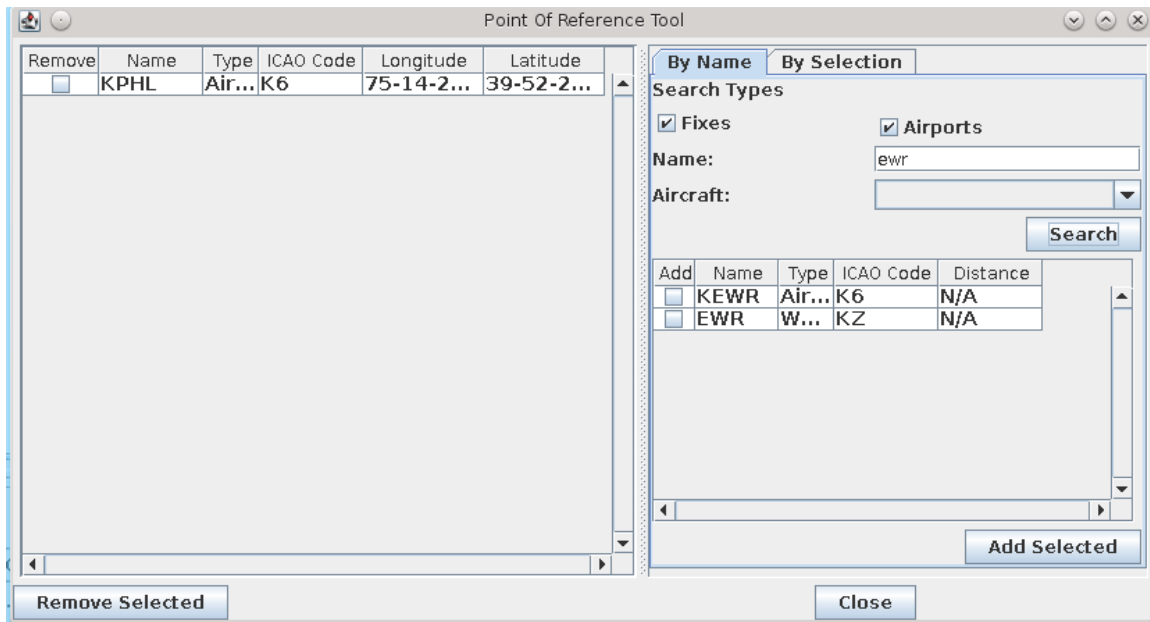
The Points of Reference Panel displays a series of reference fixes relative to the currently selected acid. When the user saves or loads PVD Preferences, discussed in section 2.1.4:PVD Menu, the points of reference will also be saved or loaded based on the preference file. The format for each entry is as follows:

- 1) The Distance from the point
- 2) The Direction the aircraft is from the point. In **Figure 44** for example, the selected aircraft is West of KEWR and North of KPHL.
- 3) The Radial out of the point to the aircraft
- 4) The points name.



**Figure 44 Points Of Reference Panel.**

In order to update the points of reference the user clicks on the “Edit Points of Reference” button which then displays the Point of Reference Dialog to the user.



**Figure 45 Points Of Reference Dialog.**

The Points of Reference Dialog provides the user with lots of power in choosing their reference points.

The Dialog is broken into two main parts:

- 1) On the left is the current Points of Reference Panel.

In this panel the user can see the selected points of reference and choose to remove them. In order to remove a reference point, the user checks the “Remove” checkbox of a point in the table and then selects the “Remove Selected” button.

- 2) On the right is the selection tabs.

There are two ways of selecting points through the Point of Reference Dialog:

- a. By Name

In this tab, shown on the right side of **Figure 45**, the user can choose to search both fixes and airports via the “Fixes” and “Airports” checkboxes. In the “Name” Text Field, the user enters the name of the fix or airport and presses the “Search” button. Any results will be shown in the table. The Table provides the user all the information the user needs to make the appropriate choice. For example in **Figure 45** both the Airport and the Waypoint for “ewr” were found.

The user can obtain further information by using the “Aircraft” drop down to select one of their aircraft in order to find out how far away the aircraft is from the results. Distance information can be extremely important if two fixes with the same name are found but one is 20nm from an aircraft and the other is 500nm away. Most likely the closer fix is the correct fix. To make a selection, the user selects the “Add” checkbox to the point(s) that they wish to use and then presses the “Add Selected” button.

- b. By Selection

The “By Selection” tab, shown in **Figure 46**, allows the user to select Fixes and Airports one at a time from the PVD. The user chooses to select either Fixes or Airports and presses the “Start Selection” button. All the fixes or Airports will be displayed on the PVD and the user can click on these Fixes or Airports to select them. Once a Fix or Airport is selected, the various fields in the “By Selection” tab will be populated with that point’s information. Similarly to the “By Name” tab there is an “Aircraft” drop down to allow to see distances from the selected point. To add the point to user’s points or reference, the user then selects the “Add” button.

The figure shows a software interface titled "By Pvd Selection Panel". It has two tabs: "By Name" and "By Selection". The "By Selection" tab is currently selected. Inside this tab, there is a section labeled "Selection Type:" with two radio buttons: "Fix" (which is selected) and "Airport". Below this is a large button labeled "Start Selection". Underneath the button, there are several labels for data fields: "Name:", "Type:", "ICAO Code:", "Latitude:", "Longitude:", "Aircraft", and "Distance To AC:". The "Aircraft" label is followed by a text input field and a dropdown arrow. At the bottom of the panel, there are two buttons: "Cancel Selection" on the left and "Add" on the right.

**Figure 46 By Pvd Selection Panel**

### 2.3.3 Tabular Control Panel

The Tabular Control Panel provides the user with even more information and command capabilities. The Tabular Control Panel is broken into 5 different panels, specialized for specific purposes.

**Figure 47 Tabular Control Panel**

### 2.3.3.1 The Arrival Tab

The Arrival tab provides the user with information and commands for aircraft on arriving at an airport. This tab consists of 4 different rows.

**Figure 48 The Arrival Tab**

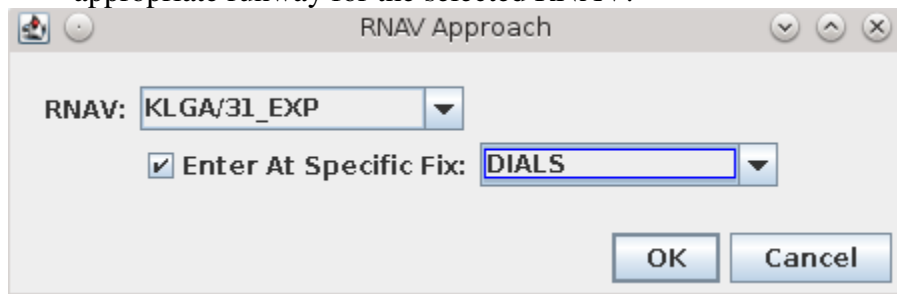
#### 1) Row 1

- a. Runway Drop Down: When an aircraft has an assigned runway it will be automatically selected in this runway combo box. When the user wishes to change the assigned runway, the user simply selects the desired runway from the drop down. A change runway command is sent to the ECO.
- b. Airport Label: This displays the selected aircraft's current assigned Airport.
- c. CLA Button: Sends a "cleared for landing" command to the ECO when clicked.
- d. LOC Button: Sends a "Join the localizer" command to the ECO when clicked.
- e. CLA NL Button: Sends a "Cleared to follow the approach down, but not to land" command to the ECO when clicked.

#### 2) Row 2

- a. Approach Flaps Button: Sends a command to the ECO to allow the aircraft to descend and slow more efficiently in terminal airspaces.

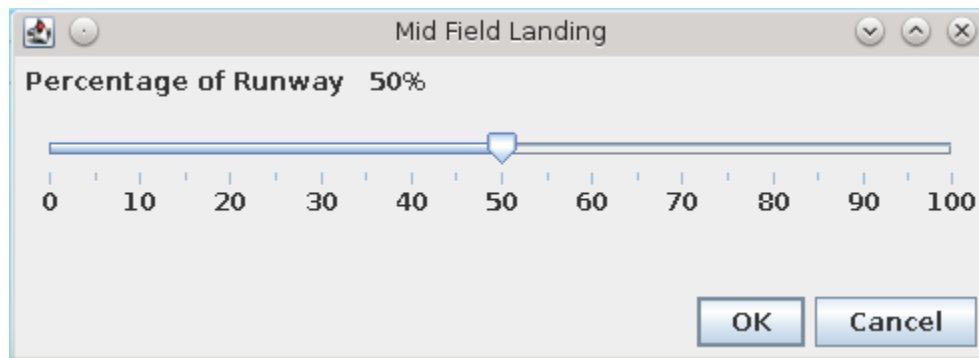
- b. CLV Button: Sends a “Cleared for visual landing” command to the ECO when clicked.
- c. RNAV Button: Displays the user with an RNAV selection dialog. The Selection dialog allows the user to select any of the RNAV’s available for the arrival airport via the RNAV drop down. Additionally, the user can select which fix to enter the RNAV on. When the user presses the “OK” button, the RNAV Command is sent to the ECO. It is important to note that the simpilot need not worry about current runway assignment when using this dialog. The runway will automatically be changed to the appropriate runway for the selected RNAV.



**Figure 49 RNAV Approach Dialog**

3) Row 3

- a. Land Mid Field Button: Displays the User with a Mid Field Landing Dialog. This dialog allows the user to use a simple slider to determine what percentage of the runway to use for the Mid Field Landing. Pressing the “OK” sends a mid field landing command to the ECO with the user specified percentage.



**Figure 50 Mid Field Landing Dialog**

4) Row 4

- a. MA Button: Sends a missed approach command to the ECO when clicked.
- b. TNGO Button: Sends a touch and go command to the ECO when clicked.
- c. TNGO R Button: Sends a touch and go command to the ECO when clicked such that the aircraft resumes its filed route after the maneuver.

### 2.3.3.2 The Departure Tab

The Departure Tab provides the user with information for aircraft on the ground at an airport looking depart. It consists of 4 rows with various ground and departure commands.

**Figure 51 The Departure Tab**

- 1) Row 1
  - a. Runway Drop Down: Displays the current assigned departure runway for the departing aircraft. The user can change the departing runway using this drop down in the same way the Runway drop down works in the Arrival Tab.
  - b. The Airport Label: Displays the departure airport.
- 2) Row 2
  - a. Resume Taxi Button: When clicked sends the ECO a resume taxi command.
  - b. Stop Button: When clicked send the ECO a stop command.
  - c. Line Up & Wait Button: When clicked sends the ECO a line up and wait command.
- 3) Row 3
  - a. Cross Runway Button: When clicked sends the ECO a command to allow the aircraft to cross the next runway.
  - b. Cross Taxiway Button: When clicked sends the ECO a command to allow the aircraft to cross the next taxiway.
  - c. Cross Fix Button: When clicked sends the ECO a command
- 4) Row 4
  - a. Take Off Button: When clicked sends the ECO a command to make the aircraft take off.
  - b. Maintn Rwy Hdg Button: When clicked sends the ECO a command to make departing aircraft follow the heading of the runway instead of continuing onto its route.

### 2.3.3.3 The Equipage Tab

The Equipage tab provides the user with information concerning the navigational and transponder setting of the selected aircraft. When the checkboxes, described below, are

selected this means that that setting is active. When the checkboxes are not selected those settings are inactive. For example, in **Figure 52** this aircraft has its transponder turned on, and is using Mode C. Mode S is inactive, the aircraft is not marked as VFR, and it is not using 1090 Extended Squitter nor is it using UAT ADSB transponders.

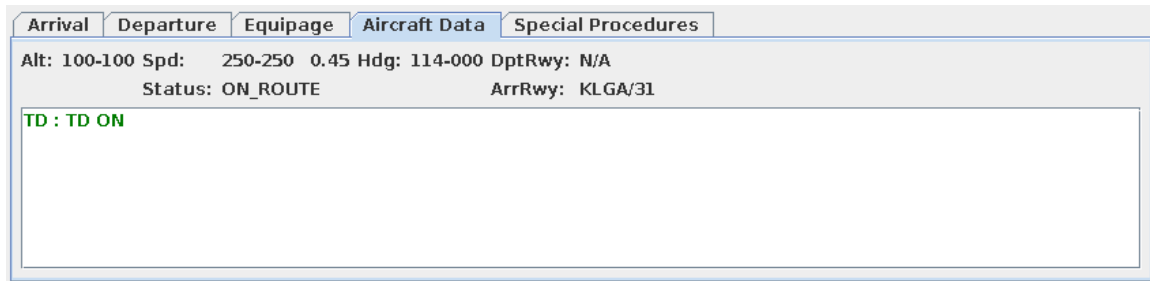
**Figure 52 The Departure Tab**

- 1) Row 1:
  - a. Transponder On: Turns the aircraft's transponder on or off
  - b. Change ADSB ICAO Code Button: Provides the user with a simple mechanism for changing the aircraft's ADSB ICAO code.
  - c. Beacon Code Button: Allows the user to change its beacon code in the same manner as described in section 2.3.1.1:Control Panel Row 1.
- 2) Row 2:
  - a. Mode C On: Turns the aircraft's Mode C transponder on or off.
  - b. VFR: Flags this aircraft as being VFR when selected or IFR when not selected.
- 3) Row 3:
  - a. Mode S On: Turns the aircraft's Mode C transponder on or off
  - b. Data Comm: Indicates whether or not this aircraft is data comm equipped. The pilot cannot adjust this setting so the checkbox is disabled. The checkbox will auto-select when data comm is available.
- 4) Row 4:
  - a. 1090 ES On: Turns the aircraft's 1090 Extended Squitter transponder on or off.
  - b. UAT On: Turns the aircraft's UAT transponder on or off.

### 2.3.3.4 The Aircraft Data Tab

The aircraft data tab provides the user with the command history of every command issued to the aircraft during the duration of the sim. It also shows the aircraft's current

state, mirroring the fields shown in the Aircraft Table described in section 2.2.1:Aircraft Tabs. The oldest commands are at the top of the scroll pane with the newest at the bottom. Commands in green were successful while commands in red failed.



The screenshot shows a software interface with five tabs: 'Arrival', 'Departure', 'Equipage', 'Aircraft Data' (which is selected), and 'Special Procedures'. Below the tabs, flight data is displayed: 'Alt: 100-100 Spd: 250-250 0.45 Hdg: 114-000 DptRwy: N/A'. Below this, 'Status: ON\_ROUTE' and 'ArrRwy: KLGA/31' are shown. A large scrollable area contains a single line of text: 'TD : TD ON' in green.

**Figure 53 The Aircraft Data Tab**

This tab is most important for two purposes:

- 1) When a pilot is working a final position and needs to know what the previous pilot was doing so that he/she can take appropriate action. For example, an aircraft may not have been cleared for approach before being handed off like it should have been.
- 2) When a pilot is required to take control of an aircraft not in their Aircraft Tables. This is when the redundant aircraft fields come in to play. The Aircraft Tab thus allows any pilot to know any information about any aircraft active in a simulation.

### **2.3.3.5 The Special Procedures Tab**

The Special Procedures Tab is designed to accommodate flights that need to perform specific, extremely complex, and repeatable procedures. To use this tab, the simulation

team will first make special procedure files which can be loaded using the “Load Procedures” button. Each procedure will be given its own tab and each step of the procedure is shown as a button. Next to each button is a blue or green square. These squares start blue and with each click of the associated button, the color swaps. This allows the pilot to keep track of how far along the sequence he or she is. Each button is given simple text explanation of what the step entails. The actual commands sent to the ECO, however, may be extremely complex and consists of many specialized commands each.



**Figure 54 The Special Procedures Tab**

## 2.4 Commands Entered Panel

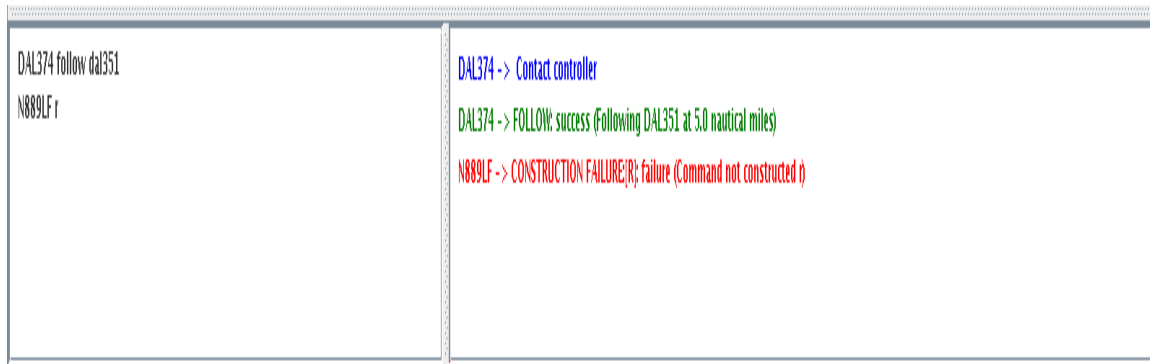


Figure 55 Commands Entered Panel

The Commands Entered window appears next on the left side of the SimPilot Workstation GUI. It will show all commands typed by the SP or input by the data link, regardless of the validity of the command.

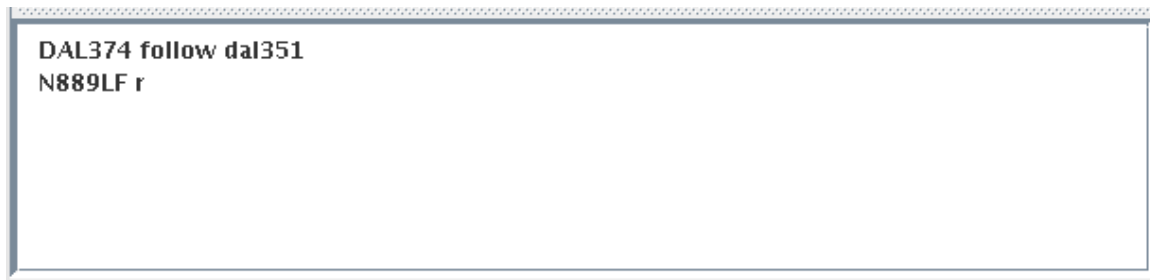


Figure 56 Commands Entered

Note that left clicking on a command will cause the entire line to reappear in the Command Input Panel.

## 2.5 Pilot Messages Panel

The Pilot Station Message Panel appears on the right side of the GUI. It will display prompts, input, errors, and warnings. Left clicking on the message causes it to be deleted.

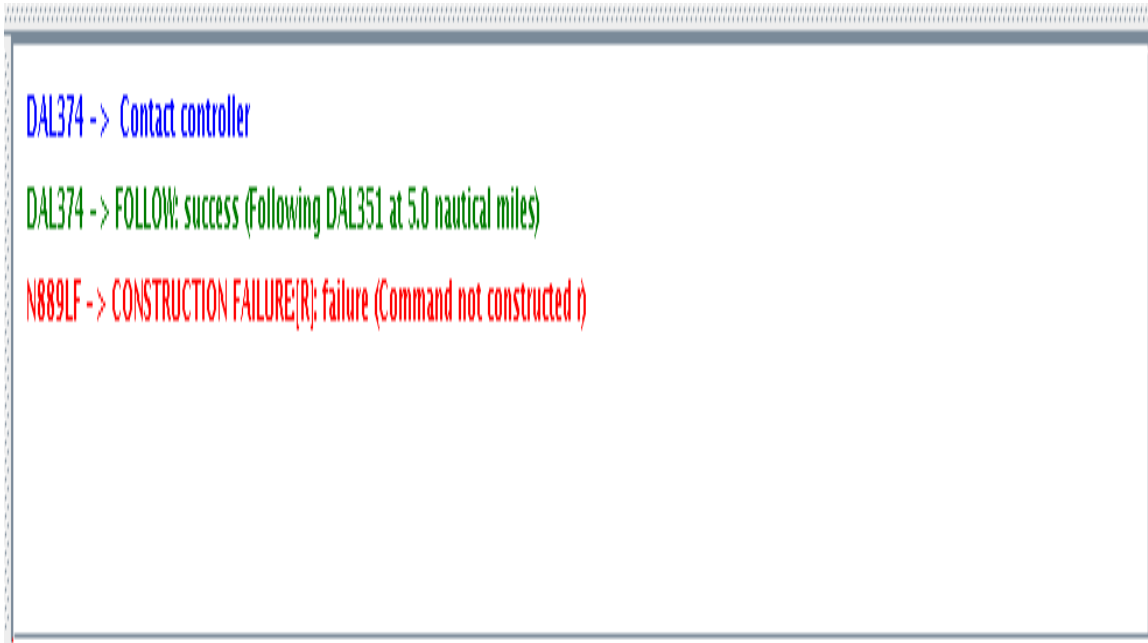


Figure 57 Pilot Messages Panel

There are different types of messages displayed (each color-coded):

- **Valid Input Commands** – These messages are displayed in **Green**.
- **Invalid Input Commands** – These messages are displayed in **Red**.
- **Local Error Messages** - indicate a typographical or other error on input. These messages normally refer to the SimPilot, although some might require interaction between the SimPilot and controller. It is left to the discretion of the SimPilot to make this determination. These messages are also displayed in **Red**.
- **Prompt/Help Messages** – messages requiring interaction between the controller and SimPilot. For example, an aircraft was given a crossing restriction, which cannot be accomplished; the SimPilot should so inform the controller. These messages are displayed in **Blue**.

## 2.6 Function Key (Macros) Panel

This portion of the SimPilot Workstation GUI allows SimPilots to map command strings to function keys F1 through F12 and Shift + F1 through Shift + F12 for quick use.

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
CC 118.30	CC 118.70	CC 119.20	CC 120.80	CC 127.30	CC 128.55	CC 132.80	; DIR DIALS; CLR EXP	DIR DIALS	CLR EXP		CC 127.30
Shift+F1	Shift+F2	Shift+F3	Shift+F4	Shift+F5	Shift+F6	Shift+F7	Shift+F8	Shift+F9	Shift+F10	Shift+F11	Shift+F12
DIR LGA	@ LGA H270			MA; H220 A20		RWY 22	RWY 31				

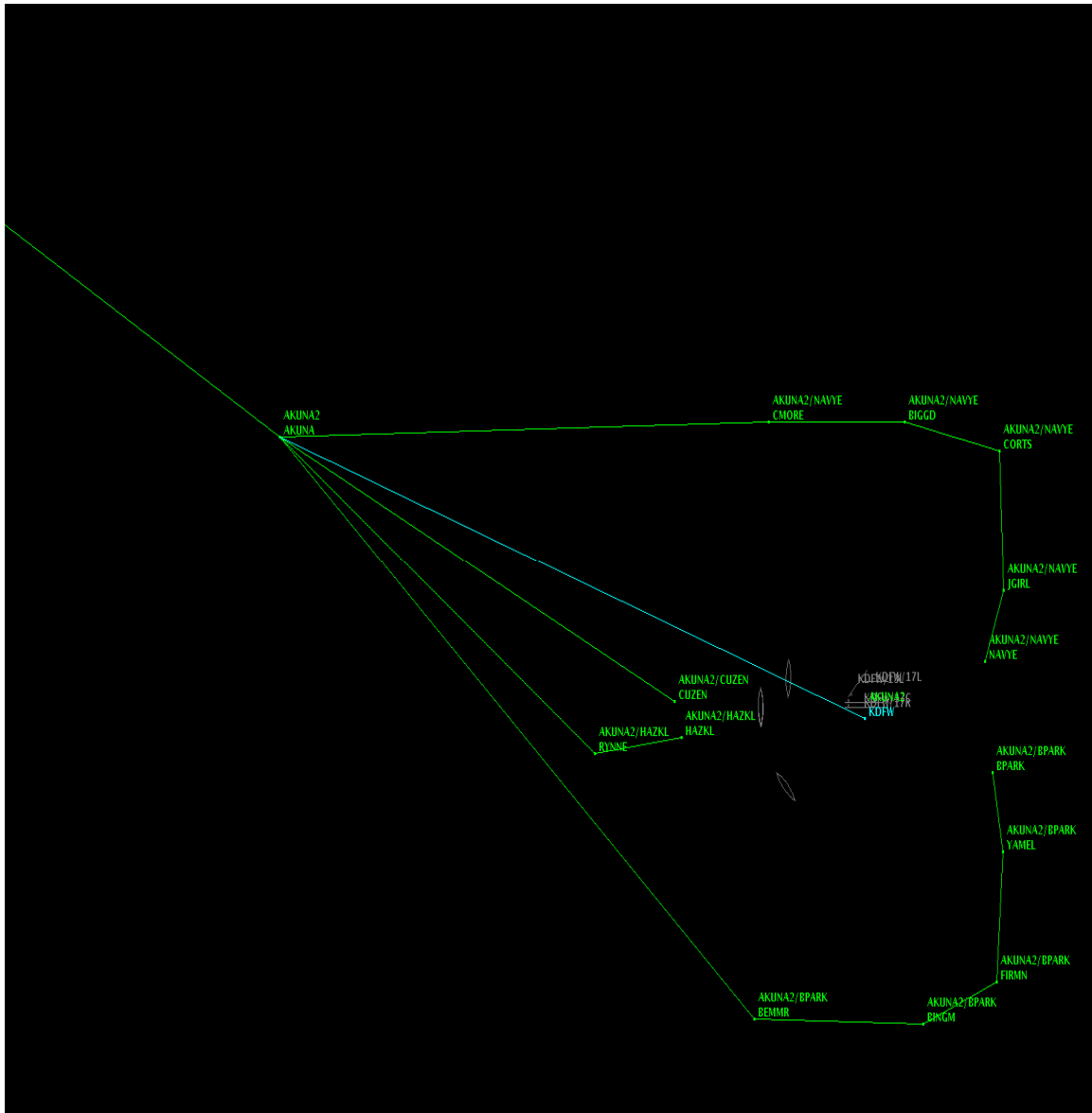
**Figure 58 Pilot Station Command Macros Panel**

## 2.7 The Planned View Display Panel (PVD)

This window provides the SimPilot with a situational awareness of the airspace within which aircraft they control are operating. It a geographical view of aircraft positions within a region and is similar to a radar scope used by controllers. **Note: The Planned View Display Panel is implemented as a variant of JPVD (Java Planned View Display). JPVD has extensive display capabilities and is documented in a separate manual.**

More information on using the PVD is available at [www.faa.gov/go/tgf](http://www.faa.gov/go/tgf) under “TGF Java Plan View Display” Manual or under the SPW’s

Help Menu (Section 0).



**Figure 59 Pilot Station Planned View Display Panel**

## 3.0 Aircraft Equipment

Letter	Definition
A	DME, transponder with Mode C
B	DME, transponder with No Mode C
C	RNAV with LORAN, VOR/DME, or INS, transponder with No Mode C
D	DME, No transponder
E	RNAV with FMS with DME/DME and IRU position updating, transponder with Mode C
F	RNAV with FMS with DME/DME position updating, transponder with Mode C
G	RNAV with GNSS, including GPS or WAAS, with en route and terminal capability, transponder with Mode C
I	RNAV with LORAN, VOR/DME, or INS, transponder with Mode C
J	RNAV with FMS with DME/DME position updating and RVSM, transponder with Mode C
K	RNAV with FMS with DME/DME position updating, and RVSM, transponder with Mode C
L	RNAV with GNSS, including GPS or WAAS, with en route and terminal capability, and RVSM, transponder with Mode C
M	TACAN, No transponder
N	TACAN, transponder with No Mode C
P	TACAN, transponder with Mode C
Q	RNAV with RNP and RVSM, transponder with Mode C
R	RNAV with RNP, transponder with Mode C
S	RNAV, transponder Mode S
T	VOR Only, transponder with No Mode C
U	VOR Only, transponder with Mode C
W	RVSM
X	VOR Only, No transponder
Y	RNAV with LORAN, VOR/DME, or INS , No transponder

For more information on Aircraft Equipment Types, please see the Aircraft Equipment Suffix Table 2-3-8 in “7110.65T Air Traffic Control Manual” at [http://www.faa.gov/airports\\_airtraffic/air\\_traffic/publications/atpubs/ATC/Chp2/atc0203.html#t1846atc](http://www.faa.gov/airports_airtraffic/air_traffic/publications/atpubs/ATC/Chp2/atc0203.html#t1846atc)

## 4.0 Acknowledgements

This Target Generation Facility (TGF) training manual is based on the documentation for Pseudo Aircraft Systems (PAS) created by NASA Ames Research Center for pseudo pilot training used by Terminal Air Traffic Control Automation (TATCA). Both the documentation and the SimPilot workstation software it describes are based on chapter 5 with the goal of providing a common Graphical User Interface (GUI) for both software portability and ease of use for Air Traffic Assistants (ATAs) who work in multiple FAA simulation environments. The original figures and graphics have been replaced by examples of the new simulation interface that comply with the TGF software requirements. The TGF-developed software uses no components that require licensing and, thus, can be adapted without royalties by other government agencies involved in aerospace safety, simulation, and training.